I/WE CLAIM:

1. A gas discharge laser having a laser gas containing fluorine comprising:

a gas discharge electrode comprising:

a copper and copper alloy electrode body having an upper curved region containing the discharge footprint for the electrode comprising copper and a lower portion comprising a copper alloy.

2. The apparatus of claim 1, further comprising:

the facing portion of the electrode is formed in a arcuate shape extending into straight line portions on either side of the arcuate portion, the straight line portions terminating in vertical straight sides, with the boundary between the copper and copper alloy including at least the arcuate portion.

3. The apparatus of claim 1 further comprising:

the electrode comprising a bonded element machined from two pieces of material the first made of copper and the second made of a copper alloy bonded together before machining.

4. The apparatus of claim 2 further comprising:

the electrode comprising a bonded element machined from two pieces of material the first made of copper and the second made of a copper alloy bonded together before machining.

5. A gas discharge laser having a laser gas containing fluorine comprising:

an elongated electrode body forming an arcuate or elliptical facing portion;

a first elongated rotated V-shaped groove formed along substantially all of the elongated electrode body;

a second elongated oppositely rotated V-shaped groove formed along substantially all of the elongated electrode body;

the first and second rotated V-shaped grooves forming a discharge receiving ridge between the first and second rotated V-shaped grooves.

6. The apparatus of claim 5 further comprising:

a differentially faster eroding material filling the first and second rotated V-shaped grooves.

7. The apparatus of claim 6 further comprising:

the differentially faster eroding material is a solder.

8. The apparatus of claim 5 further comprising:

the differentially faster eroding material is a lead-tin solder.

9. The apparatus of claim 6 further comprising:

the differentially faster eroding material is a lead-tin solder.

10. The apparatus of claim 7 further comprising:

the electrode body comprising annealed copper.

11. The apparatus of claim 8 further comprising:

the electrode body comprising annealed copper.

12. The apparatus of claim 9 further comprising:

the electrode body comprising annealed copper.

13. A gas discharge laser having a laser gas containing fluorine comprising:

a first and a second elongated gas discharge electrode;

the first and the second elongated gas discharge electrodes facing each other to form a gas discharge region between the first and the second elongated gas discharge electrodes:

at least one of the first and second elongated gas discharge electrodes being machined to form a crown to receive the gas discharge that compensates for the

bowing of at least one of the gas discharge electrodes during operation of the fluorine gas discharge laser.

14. The apparatus of claim 13 further comprising:

one of the gas discharge electrodes is a cathode attached to a wall of a gas discharge chamber of the fluorine gas discharge laser and the cathode bows during operation of the fluorine gas discharge laser; and

at least one of the cathode and the other of the gas discharge laser electrodes is machined to maintain a constant gas discharge region separation between the cathode and the other electrode to accommodate for the bowing of the cathode.

15. The apparatus of claim 14 further comprising:

the cathode is machined to an apex at the center to accommodate for the bowing of the cathode.

16. The apparatus of claim 14 further comprising:

the other electrode is machined to an apex at generally the center to accommodate for the bowing of the cathode.

17. A method of making an electrode for a gas discharge laser having a laser gas containing fluorine comprising:

fabricating the electrode utilizing a copper and copper alloy cathode body having an upper curved region containing the discharge footprint for the electrode comprising copper and a lower portion comprising a copper alloy by diffusion bonding the upper curved region to the lower portion.

18. The method of claim 17, further comprising:

forming the facing portion of the electrode in a arcuate shape extending into straight line portions on either side of the arcuate portion, the straight line portions terminating in vertical straight sides, with the boundary between the copper and the copper alloy including at least the arcuate portion.

19. The method of claim 17 further comprising:

fabricating the electrode from a bonded element machined from two pieces of material the first made of copper and the second made of a copper alloy bonded together before machining.

20. The method of claim 18 further comprising:

machining the electrode from a bonded element formed of two pieces of material the first made of copper and the second made of a copper alloy bonded together before machining.

21. A method of making a gas discharge laser having a laser gas containing fluorine comprising:

forming an elongated electrode body in the shape of an arcuate or elliptical facing portion;

forming a first elongated rotated V-shaped groove along substantially all of the elongated electrode body;

forming a second elongated oppositely rotated V-shaped groove along substantially all of the elongated electrode body;

the first and second rotated V-shaped grooves forming a discharge receiving ridge between the first and second rotated V-shaped grooves.

22. The method of claims 21 further comprising:

filling the first and second rotated V-shaped grooves with a differentially faster eroding material.

23. The method of claim 22 further comprising:

the differentially faster eroding material is a solder.

24. The method of claim 21 further comprising:

the differentially faster eroding material is a lead-tin solder.

25. The method of claim 22 further comprising:

the differentially faster eroding material is a lead-tin solder.

26. The method of claim 23 further comprising:

the electrode body comprising annealed copper.

27. The method of claim 24 further comprising:

the electrode body comprising annealed copper.

28. The method of claim 25 further comprising:

the electrode body comprising annealed copper.

29. A method of making a gas discharge laser having a laser gas containing fluorine comprising:

forming a first and a second elongated gas discharge electrode;

the first and the second elongated gas discharge electrodes facing each other to form a gas discharge region between the first and the second elongated gas discharge electrodes:

machining at least one of the first and second elongated gas discharge electrodes to form a crown to receive the gas discharge that compensates for the bowing of at least one of the gas discharge electrodes during operation of the fluorine gas discharge laser.

30. The method of claim 29 further comprising:

one of the gas discharge electrodes is a cathode attached to a wall of a gas discharge chamber of the fluorine gas discharge laser and the cathode bows during operation of the fluorine gas discharge laser; and

at least one of the cathode and the other of the gas discharge laser electrodes is machined to maintain a constant gas discharge region separation between the cathode and the other electrode to accommodate for the bowing of the cathode.

31. The apparatus of claim 29 further comprising:

machining the cathode to an apex at the center to accommodate for the bowing of the cathode.

32. The apparatus of claim 29 further comprising:

machining the other electrode to an apex at generally the center to accommodate for the bowing of the cathode.